Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Name of Program: Bachelor of Technology in Electronics & Communication

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC401	EC	**Linear Integrated Circuits**	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical: **C** - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:
This course provides the foundation education in operational amplifier and other linear integrated circuits and also familiarizes students with applications of various ICs.

Course Outcomes:
After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The student will be able to:

CO1: Inculcate the basic principles, configurations and practical limitations of op-amp.

CO2: Explain and design the linear and non-linear applications of an Op-Amp and special application ICs.

CO3: To analyze, design and explain the characteristics and applications of active filters.

CO4: Elucidate and compare the working of Multivibrators, Oscillators.

CO5: Illustrate the function of application specific ICs such as Voltage regulators, PLL and its application in communication.

Syllabus

Unit 1
Op Amps: Block diagram of Op-Amp, Basic Differential amplifier using transistors and its operation, characteristics and equivalent circuits of an ideal op-amp, Power supply configurations for OPAMP applications, Voltage Transfer Curve, open loop op-amp configurations: inverting, non-inverting and differential amplifier configurations, Closed loop op-amps or feedback amplifiers.

Linear Applications of Op-Amp: Voltage follower, Summing amplifier, Scaling and averaging amplifier, Integrators and differentiators, Instrumentation amplifier, Differential input and differential output amplifier, Log/ Antilog amplifier, V-I and I-V converter, analog multiplier-MPY634.

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Unit 2

The Practical Op-Amp: Introduction, Input offset voltage, offset current, Bias Current, thermal drift, Effect of variation in power supply voltage, common-mode rejection ratio, Slew rate and its Effect, PSRR and gain –bandwidth product, frequency limitations and compensations, interpretation of TL082 datasheet.

Unit 3

Active Filters: Characteristics of filters, Classification of filters. Magnitude and frequency response, Design of Butterworth 1st and 2nd order Low pass, High pass filters, Band pass and Band reject filters, All pass filters.

Unit 4

Signal Generators and Waveform Shaping Circuits: Oscillator-Phase-shift oscillators, Wein bridge oscillator, Quadrature Oscillator, Monostable and Astable Multivibrator, Precision rectifiers, Square and Triangular wave generator, VCO. Comparator. Zero Crossing Detector. Schmitt Trigger, Voltage limiters, Clipper and clampers, Absolute value output circuit. Peak detector, Sample and hold Circuit.

Unit 5

Advanced IC applications: Applications as Frequency Divider. PLL, AGC, AVC using op-AMP, simple OP-AMP Voltage regulator. Fixed and Adjustable Voltage Regulators, Dual Power supply, Basic Switching Regulator and characteristics of standard regulator ICs – TPS40200, TPS40210

Text Books:

1. Ramakanth A. Gayakwad, "Op-Amps & Linear ICS", PHI, 4th edition, 1987.
2. D. Roy Chowdhury, " Linear Integrated Circuits", New Age International (P) Ltd, 2nd Edition, 2003.

Reference Books:

1. R.F. Coughlin & Fredrick Driscoll, "Operational Amplifiers & Linear Integrated Circuits" , 6thEdition, PHI
2. David A. Bell, "Operational Amplifiers & Linear ICs", Oxford University Press, 2nd edition, 2010.
3. Sergio Franco, "Design with Operational Amplifiers & Analog Integrated Circuits" Mcgraw Hill, 1988.
4. C.G. Clayton , "Operational Amplifiers " , Butterworth & Company Publ. Ltd./Elsevier, 1971.

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5. K. Lal Kishore, " Operational Amplifiers and Linear Integrated Circuits", Pearson Education, 2007.
6. L. k. Maheshwari, M M S Anand , Analog Electronics, PHI
7. TL082:Data Sheet:http://www.ti.com/lit/ds/symlink/tl082.pdf
   Application Note:http://www.ti.com/lit/an/sloa020a/sloa020a.pdf
8. MYP634: Data Sheet:http://www.ti.com/lit/ds/symlink/mpy634.pdf
   Application Note:http://www.ticom/lit/an/sbfa006/sbfa006.pdf

List of Experiments:

1. Introduction of ASLKv2010 starter-kit & Simulation software
2. Measurements of Op-Amp parameters- CMRR, slew rate ,open loop gain.
3. To develop an understanding of Inverting and non-inverting Op-Amp.
4. To Learn about AC electrical characteristic of Op-Amp.
5. To Learn about Integrator and Differentiator.
6. To Learn about Instrumentation Amplifier.
7. To learn about Analog low pass and high pass filter.
8. To learn about Astable Multivibrator.
9. To learn and study about frequency generation using VCO.
10. To learn and study ADC/DAC circuits.
11. Design a function generator capable of generating a square wave and a triangular wave of a known frequency f.
12. Perform an experiment to plot the Input Vs Output characteristics for the AGC/AVC.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								CREDITS
			THEORY			PRACTICAL		Th	T	P	
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC402	EC	Digital Electronics	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives:-

The objective of this course is to-
1. Use of Boolean algebra and Karnaugh Map to simplify logic function.
2. Describe the operation of different Combinational and Sequential Logic Circuits.

Course Outcomes:-

After completion of this course the students will be able to-
1. Design an optimal digital logic circuit to meet the given specifications.
2. Evaluate the performance of the given digital logic circuit based on specific criteria for reliable system implementation.

Syllabus

UNIT 1

Logic Function Optimization and Arithmetic Circuits

Logic Function, Sum of Product and Product of Sum form, Karnaugh Map minimization, Incompletely specified functions. Arithmetic Circuits- Half Adder, Full Adder, Half Subtractor, Full Subtractor, Parallel Adders/Subtractors- Ripple Carry Adder, Carry Look Ahead Adder. Serial Adders /Subtractors.
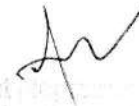
UNIT 2

Combinational Circuits

Multiplexers, Demultiplexers, Encoders- Binary Encoders, Priority Encoders. Decoders, Synthesis of logic functions using Multiplexers and Decoders. Structural modeling of higher order circuits using lower order circuits, Code converters.

UNIT 3

Sequential Design Elements

S-R Latch, D- Latch, Flip Flops- Master Slave and Edge Triggered. S-R, D, J-K, T , State Table. State Equation, Timing Diagram, Excitation Table, Flip Flop Conversions. Setup and Hold Time. 555 Timer chip and its application in multivibrators.

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UNIT 4

Sequential Circuits

Registers, Shift Registers, Counters- Synchronous and Asynchronous counters, Design Examples, Synchronous Sequential Circuits, State Machines, Mealy and Moore Model, State Diagram, State Table, State Assignment, State Minimization, Design Examples.

UNIT 5

Logic Families

Characteristics of Digital ICs- Voltage Levels, Speed, Power, Noise Margin, Fan In, Fan Out, Logic Families- TTL, MOS- NMOS, PMOS, CMOS, ECL, IIL.

Text Books:

1. M. Morris Mano: Digital Logic Design, Pearson Education
2. Salivahanan and Ari Vahagan: Digital Circuits and Design, Vikas Publishing House

Reference Books:

1. Anand Kumar: Fundamentals of Digital Circuits, PHI.
2. Floyd and Jain: Digital Fundamentals, Pearson Education.
3. Roland J. Tocci, Widmer, Moss: Digital Systems Principles and Applications, Pearson Education.
4. Stephen Brown I Zvanko Vranesic: Fundamentals of Digital Logic Design, The Mc Graw Hill

List of experiments

1. Implementation of Adders and Subtractors.
2. Realization of multiplexers and demultiplexers.
3. Synthesis of logic function using multiplexer.
4. Design and analysis of Encoder and Decoders.
5. Analysis of various flip flops with Preset and Clear capability.
6. Design of Astable , Monostable and Bistable multivibrator using 555 Timer.
7. Design of various Shift registers.
8. Design of Johnson and Ring counter.
9. Design of synchronous and asynchronous up/down counters.
10. Design of logic functions using PLDs.
11. Design of some minor projects based on digital circuits to solve real life problems.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME					Th	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC403	EC	**Electro Magnetic Theory**	60	20	20	0	0	3	1	0	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; *****Teacher Assessment** shall be based following components: Quiz/Assignment/ . Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:-

1. Obtain an understanding of physical laws governing electromagnetic effects in the form of Maxwell's equations
2. Understand the concepts of static and time varying fields with an emphasis on wave propagation
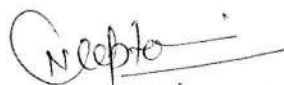
Course Outcomes:-

After completion of this course students should be able to

1. Apply vector calculus to determine the electric and magnetic fields and energy stored due to specified charge and current distribution.
2. Apply Maxwell's equation in Differential and integral forms for the solution of appropriate problems involving static as well as time varying fields.
3. Discuss and analyze propagation of electromagnetic waves in free space, dielectric and conducting media

Syllabus

UNIT I – ELECTROSTATICS

Introduction to various Co-ordinate systems and Co-ordinate transformations, Vector calculus, Divergence and Stokes theorem, Laplacian of a scalar and vector, Coulomb's law, Electric field intensity, Electric fields due to: point, line, surface and volume charge distributions, Electric flux density, Gauss's law and its application, Electric potential, Potential gradient, Electric dipole: dipole moment, potential & electric field intensity due to dipole, Energy stored in electrostatic fields, Method of images. Poisson's and Laplace's equations, Solution of Laplace's equation, Uniqueness theorem, Electric boundary conditions, Equation of continuity and relaxation time.

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UNIT II – MAGNETOSTATICS

Magnetic field intensity, Magnetic flux, Magnetic flux density, Biot-Savart Law, Magnetic field due to: straight conductors, circular loop, infinite sheet of current, Ampere's circuital law and its application, Magnetic scalar and vector potential, Force on a moving charge and current elements, Force and torque on closed circuit, Magnetic dipole, Magnetic polarization, Self and mutual inductance, Energy stored in magnetic fields, Magnetic boundary conditions.

UNIT III – TIME VARYING FIELDS

Faraday's Law, Induced EMF for time varying fields, Displacement current, Maxwell's equation in point form, Maxwell's equation in integral form, Concept of retarded potential, Poynting vector theorem, Complex poynting vector.

UNIT IV – ELECTROMAGNETIC WAVES

Solution of wave equation, Propagation of plane EM wave in: perfect dielectric, lossy medium and good conductor, Media-attenuation, Phase velocity, Group velocity, Skin depth. Reflection and refraction of plane electromagnetic waves at boundaries for normal & oblique incidence. Snell's law of refraction, Brewster angle, Polarization of electromagnetic wave: linear, circular and elliptical polarization.
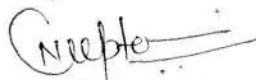
UNIT V –TRANSMISSION LINES

Transmission Line parameters and equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR, UHF Lines as Circuit Elements, Impedance Transformations. Smith Chart – Configuration and Applications, Single and Double Stub Matching.

TEXT BOOKS:

1. Matthew. N.O. Sadiku, "Elements of Electromagnetics", Oxford University Press, First Indian Edition, 2010.
2. Shankar Prasad Ghosh, Lipika Datta, "Electromagnetic Field Theory", McGraw Hill.1st edition, 2012
3. Gangadhar.K.A, "Field theory", Khanna Publishers, New Delhi, 15th edition, 2004.
4. Umesh Sinha , "Transmission Lines and Networks", Satya Prakashan, 2003.

REFERENCE BOOKS:

1. William Hayt, "Engineering Electromagnetics", McGraw Hill, 7th edition, 2011.
2. David K Cheng, "Field and Wave Electromagnetics", Pearson Education, 2nd edition, 2004.
3. John D. Kraus, "Electromagnetics" McGraw Hill, 5th edition, 1999.
4. Narayana Rao N, "Elements of Engineering Electro Magnetics", Prentice Hall of India, 6th edition, 2008.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC404	EC	Analog Communication	60	20	20	30	20	3	1	2	5

Legends: Th - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objective:

To provide the basic fundamentals, principles, concepts of communication systems, various modulation techniques of analog communication systems and basic concepts from noise analysis.

Course Outcome:

After completion of this course the students are expected to be able to demonstrate following attributes:

1. Ability to analyze signals in the time domain and frequency domains.
2. Ability of demonstrating various analog modulation and demodulation techniques and apply suitable modulation techniques for various applications.
3. Ability to analyze the noise signal.

Syllabus

UNIT-I

Signals: Classification of signals, Time Domain and Frequency Domain Representation, singularity functions for continuous time.

Spectral Analysis: Fourier series analysis, Fourier Transform and its Properties, Transform of various signals. Parseval's Theorem, Energy and Power Spectral Density of various types of signals.

Systems: Classification of systems, Impulse Response and Convolution integral.

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UNIT-II

Amplitude modulation Techniques

Need of modulation, Amplitude modulation: frequency spectrum, single tone and multi tone AM, generation of AM (square law modulator, switching modulator), Detection of AM (Square law detector, envelope detector), Power distribution, DSB-SC: generation and detection techniques, SSB: generation and detection techniques. Radio Receiver and its characteristics, TRF receivers, Super-heterodyne Receiver, Image frequency signal and its rejection, Intermediate frequency selection, frequency mixer, AVC.

UNIT-III

Angle modulation Techniques

Frequency and phase modulation, spectrum and bandwidth, Narrowband FM, Wideband FM, FM Modulators: Direct and Indirect method of frequency modulation, FM Detectors: Slope Detector, Foster Seeley Discriminators, Ratio-Detectors and PLL detectors, AFC, Pre-Emphasis and De-Emphasis filters.

Unit-IV

Noise

Sources and types of noise, White Noise, Noise in linear system: single and multiple noise source, Super Position of Power Spectrum, Equivalent Noise Bandwidth, Noise Figure, and Equivalent Noise Temperature, their Relationship, Calculation of Noise Figure and Noise Temperature for Cascade Systems.
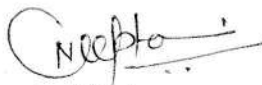
UNIT-V

Pulse Modulation Techniques

Pulse amplitude modulation and demodulation, Pulse width modulation and demodulation, Pulse position modulation and demodulation, Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, comparison of FDM and TDM, PAM-TDM signaling rate and bandwidth.

Text Books:

1. B.P. Lathi and Zhi Ding, "Modern Digital and Analog Communication System"; 4th Edition, Oxford University Press, 2011.
2. R.P. Singh and S.D. Sapre, "Communication Systems: Analog and Digital", McGraw Hill Education: 3rd Edition, 2012.
3. Herbert Taub, Donald L Schilling, Gautam Saha, "Principles of Communication Systems, McGraw Hill Education; 4th Edition, 2013.
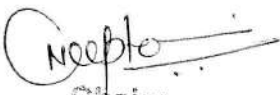
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Reference Books:

1. P Ramakrishna Rao, "Analog Communication", McGraw Hill Education, 1st Edition, 2011.
2. Simon Haykin, Michael Moher, "Communication System", John Wiley, 5th Edition, 2010.
3. H P. Hsu: "Schaum's Outline of Signals and Systems", McGraw Hill Education, 3rd Edition, 2014.
4. H P. Hsu: "Schaum's Outline Analog and Digital Communications", McGraw Hill Education, 3rd Edition, 2009.
5. John G. Proakis, Masoud Salehi, "Fundamental of Communication Systems", Pearson Edition, 2nd Edition, 2014.
6. Wayne Tomasi, "Electronic Communication Systems: Fundamentals Through Advanced", Pearson Edition, 5th Edition, 2008.

List of Experiment:

1. To study various types of signals using Matlab.
2. To understand and analyze the Fourier Series Decomposition and Reconstruction for periodic Signals.
3. To analyze, understand the Amplitude modulation and obtain the value of modulation index.
4. To understand Amplitude demodulation and analyze the effect of Modulation Index.
5. To analyze and understand frequency modulation.
6. To analyze and understand frequency demodulation.
7. To obtain and analyze the spectrum of Amplitude modulated signals using Matlab.
8. To obtain and analyze the spectrum of Frequency modulated signals using Matlab.
9. To understand various pulse modulation schemes and analyze the effect of sampling frequency.
10. To design the Pre-emphasis and De-emphasis Filters.
11. To study the effect of noise in AM & FM Systems.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
ML301	EC	Environment and Energy Studies	60	20	20	0	0	3	1	0	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; Q/A – Quiz/Assignment/Attendance, MST Mid Sem Test.

Course Educational Objectives: The students will be able to:

1. To understand sources of information required for addressing environmental challenges
2. To identify a suite of contemporary tools and techniques in environmental informatics
3. To apply literacy, numeracy and critical thinking skills to environmental problem-solving

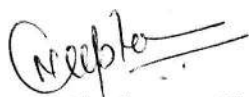Course Outcomes: The students should be able to:

1. Apply the principles of ecology and environmental issues that apply to air, land and water issues on a global scale.
2. Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
3. Demonstrate ecology knowledge of a complex relationship between predators, prey, and the plant community.

Unit I
Environmental Pollution and Control Technologies: Environmental Pollution & Control: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and industrial pollution, Ambient air quality standards. Water pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid Waste management composition and characteristics of e - Waste and its management. Pollution control technologies: Wastewater Treatment methods: Primary, Secondary and Tertiary.

Unit II
Natural Resources: Classification of Resources: Living and Non - Living resources, water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problem, Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources. Land resources: Forest resources, Energy resources: growing energy needs, renewable energy source, case studies..

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Unit III

Ecosystems: Definition, Scope and Importance ecosystem. Classification. Structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Energy flow in the ecosystem, Biogeochemical cycles, Bioaccumulation, ecosystem value, devices and carrying capacity. Field visits.
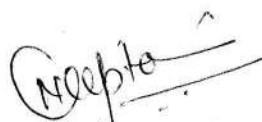
Unit IV

Biodiversity and its Conservation: Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a megadiversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, manwildlife conflicts; Conservation of biodiversity: In-situ and Exsitu conservation. National biodiversity act.

Unit V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan(EMP)

Suggested Readings:

1. Agarwal, K.C.,(latest edition).Environmental Biology, Bikaner :Nidi Pub. Ltd.,
2. Brunner R.C.(latest edition) Hazardous Waste Incineration, McGraw Hill Inc.
3. Clank R.S. .,(latest edition. Marine Pollution, Clanderson Press Oxford (TB).
4. Environmental Encyclopedia, Jaico Pub. Mumbai,
5. De A.K(latest edition) Environmental Chemistry, Wiley Wastern Ltd.
6. ErachBharucha(2005).Environmental Studies for Undergraduate Courses by for University Grants Commission.
7. R. Rajagopalan(2006).Environmental Studies. Oxford University Press.
8. M. AnjiReddy(2006).Textbook of Environmental Sciences and Technology. BS Publication.
9. Richard T. Wright(2008).Environmental Science: towards a sustainable future PHL Learning Private Ltd. New Delhi.
10. Gilbert M. Masters and Wendell P. Ela .(2008).Environmental Engineering and science. PHI Learning Pvt Ltd.
11. Daniel B. Botkin& Edwards A. Keller(2008).Environmental Science Wiley INDIA edition.
12. Anubha Kaushik(2009), Environmental Studies. New age international publishers.

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Bachelor of Technology (Electronics & Communication)
SEMESTER IV

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME									
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS207	CS	Computer Programming-II	-	-	-	30	20	-	-	2	1

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical;   C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class,
given that no component shall exceed more than 10 marks.

Course Objectives:
1. To understand Object oriented concepts.
2. To understand programming using object oriented techniques.
3. To understand the use of various system libraries.
4. To have the knowledge of important topics and principles of software development.
5. To write a computer program &to solvespecified problems.
6. To use the Java SDK environment to create, debug and run simple Java programs.
7. To study event driven Graphical User Interface (GUI) programming

Course Outcomes:
1. Students should be able to explain the object oriented concepts.
2. Students should be able to write programs using object-based programming techniques including classes, objects and inheritance.
3. Able to use of various system libraries.
4. Be aware of the important topics and principles of software development.
5. Have the ability to write a computer program to solvespecified problems.
6. Be able to use the Java SDK environment to create, debug and run simple Java programs.
7. Introduce event driven Graphical User Interface (GUI) programming

UNIT I   **8 Hrs.**
Java Fundamentals: Features of Java, OOPs concepts, Java virtual machine, Byte code interpretation
Data types, variable, arrays, expressions, operators, and control structures, Objects, Introduction to
Class: Instance members and member functions, constructors, constructor overloading, Static Method,
Static classes, Inner classes

UNIT II   **8 Hrs.**
Introduction to Java classes and objects: Java features: Java syntax, data types, data type conversions,
control statements, operators and their precedence. Introduction to Class: Instance members and
member functions. Inner Classes, String Handling, Wrapper classes

8 Hrs.

UNIT III
Inheritance, Polymorphism and Collection: Class relationships: Inheritance and its types, Merits and Demerits. Association, Association inheritance, Polymorphism: Dynamic method dispatch, Runtime polymorphism, Abstract classes, Interfaces and packages, Collections.

8 Hrs.

UNIT IV
Exception Handling and Multithreading: Exceptions: Need for exceptions, Exception hierarchy: Checked Unchecked exceptions, Try, catch, finally, Throw, throws, creating exceptions.
Multithreading: Thread Life cycle, Multi threading advantages and issues, Simple thread program, Priorities and scheduling, Thread Synchronization.

10 Hrs.

UNIT V
Java I/O, Applets, Event Handling, and Database Connectivity: Basic concept of streams I/O stream & reader-writer classes. File handling. Applet and its Life Cycle, Basic GUI elements, Event Delegation Model and event handling Swing components: Applet, JButton, JFrame, etc.Sample swing programs JDBC architecture, establishing connectivity and working with connection interface working with statements, Creating and executing SQL statements, working with Result Set

References:
1. Kathy Sierra, Bert Bates, "Java- Head First" 2nd edition.
2. E. Balaguruswamy, "Programming with Java A Primer", Tata McGraw Hill Companies.
3. John P. Flynt Thomson, "Java Programming" 2nd.
4. Ken Arnold, "Java Programming Language", Pearson
5. Hervertschildt, "The complete reference JAVA2", TMH.
6. Cay Horstmann, "Big Java", 2nd edition, Wiley India Edition.
7. Balaguruswamy, "Java"

Practical's List:
1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes
11. Write a program to Add a Class to a Package
12. Write a program to show Life Cycle of a Thread
13. Write a program to demonstrate AWT.
14. Write a program to Hide a Class
15. Write a Program to show Data Base Connectivity Using JAVA
16. Write a Program to show "HELLO JAVA" in Explorer using Applet
17. Write a Program to show Connectivity using JDBC

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18. Write a program to demonstrate multithreading using Java.
19. Write a program to demonstrate applet life cycle.
20. Write a program to demonstrate concept of servlet

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INDORE (M.P.)

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